

# WEIL-McLAIN

## WGO, WTGO and SGO-W

### Series 3 Oil-Fired Water Boilers

#### Maintenance and Service Guide



For future reference, leave this manual  
with other boiler instructions  
in the envelope provided with the boiler.

Part No. 550-141-828/1202



# Read This Page First

## Hazard Definitions

Following terms are used to bring attention to the presence of hazards of various risk levels, or to important information concerning product life.



Indicates presence of hazards that will cause severe personal injury, death or substantial property damage if ignored.



Indicates presence of hazards that can cause severe personal injury, death or substantial property damage if ignored.



Indicates presence of hazards that will or can cause minor personal injury or property damage if ignored.

**NOTICE**

Indicates special instructions on installation, operation, or maintenance that are important but not related to personal injury hazards.

## Symbol Definitions

These symbols indicate information for and procedures to be followed by:



**Homeowner or person responsible for simple start-up and routine maintenance of boiler and system.** Pages 2 through 6 must be followed to assure proper operation of your boiler. Page 7 lists common problems and possible corrections. In addition, it is your responsibility to:

- Have boiler and burner installed by a qualified installer.
- Have boiler and burner serviced annually by a qualified service technician.
- Review and understand start-up and routine maintenance procedures with qualified service technician.
- Perform routine maintenance as described on page 4.



**Qualified service technician who has the necessary equipment to check the boiler and system performance, and is responsible for start-up and service of boiler and system.** Pages 2 and 3 and 8 through 11 must be followed to assure proper operation of this boiler. In addition, it is the responsibility of this person to:

- Annually service boiler and burner to assure proper operation. See page 8 for service record.
- Review and explain start-up and routine maintenance procedures with homeowner.

# For Your Safety



**⚠ DANGER** Follow instructions below to prevent severe personal injury, death or substantial property damage:

- **Do not** use crankcase drainings or any oil containing gasoline. See burner manual for proper fuel oil.
- **Do not** attempt to start burner when excess oil has accumulated in combustion chamber, when unit is full of vapor, or when combustion chamber is very hot.
- **Do not** start burner unless collector hood, flue cap, jacket cap, breeching and burner mounting door are secured in place.
- **Never** burn garbage or paper in the boiler.
- **Never** leave combustible material around boiler.
- **DO NOT TAMPER WITH UNIT OR CONTROLS.** Always follow specific instructions when starting up boiler or performing routine maintenance or service.

**⚠ WARNING** Follow instructions below to prevent severe personal injury, death or substantial property damage:

- To avoid electric shock, disconnect electrical supply to burner service switch and additional external switches before performing service.
- To avoid severe burns, allow boiler to cool before performing service.
- Do not block flow of combustion or ventilation air to boiler.
- Boiler must be connected to a flue with sufficient draft at all times to assure proper operation.

Do not use this boiler if any part has been under water. Electrical and mechanical failures may cause electric shock and fire risks. Immediately call a qualified service technician to inspect chimney or vent, boiler and burner. Have the boiler flueways cleaned and have the following replaced:

- all electrical and mechanical controls
- electrical wiring
- oil burner and controls
- insulation and chamber lining

## Tips for water systems:

- Check boiler and system piping for leaks. Continual makeup water will reduce boiler life. Minerals can build up in sections, reducing heat transfer and causing cast iron to overheat, resulting in section failure.

### ⚠ CAUTION

Failure to maintain recommended pH and repair leaks can cause section iron corrosion, leading to section failure and leaks. Do not use petroleum-based sealing or stop-leak compounds in boiler systems. Damage to system components can result, causing property damage.

- Boiler water pH 7.0 to 8.5 is recommended. For pH conditions outside 7.0 to 8.5 range or unusually hard water areas (above 7 grains hardness), consult local water treatment company.
- When using antifreeze:
  - Use antifreeze especially made for hydronic systems. Inhibited propylene glycol is recommended.

### ⚠ WARNING

Do not use automotive, ethylene glycol, undiluted or petroleum-based antifreeze. Severe personal injury, death or substantial property damage can result.

- 50% solution provides protection to about -30°F.
- Local codes may require back-flow preventer or actual disconnect from city water supply.
- Determine quantity according to system water content. Boiler water content is listed on back cover of Boiler Manual. Percent of solution will affect sizing of heat distribution units, circulator and expansion tank.
- Follow antifreeze manufacturer's instructions.
- Do not add cold water to hot boiler. Thermal shock can cause sections to crack.



# Routine Maintenance Schedule

The schedule below is specifically designed for the homeowner.  
Please read pages 2 and 3 before proceeding.

## Beginning each heating season:

- ✓ Call a qualified service technician to perform annual service.

## Daily during heating season:

- ✓ Check that boiler area is free from combustible materials, gasoline and other flammable vapors and liquids.

## Weekly during heating season:

- ✓ Check for and remove any obstructions to flow of combustion or ventilation air to boiler.
- ✓ Check that breeching is attached between boiler and chimney. If breeching is loose or damaged, immediately turn off switch on boiler and call service technician to repair.
- ✓ Check for oil leaks in oil piping and around burner. If found, immediately call qualified service technician to correct situation.
- ✓ Check for water leaks in boiler and piping; also check for leaks around tankless heater plate, if installed. If found, immediately call service technician to repair.

## End of heating season:

- ✓ If tankless heater is installed, boiler will continue to operate. Check for the following:
  - All daily and weekly instructions listed on this page must be followed.
  - Burner motor may have to be oiled. Some motors are permanently lubricated and do not need additional oil. Check for oiling instructions on burner or motor.

## Boiler shutdown:

Do not drain boiler unless exposure to freezing temperatures will occur. Always keep manual fuel supply shut off if burner is shut down for an extended period of time.

- Turn off switch at boiler and any external switch to boiler.
- Close fuel valves.
- Turn off water feed valve.
- Cover burner to protect from dust and dampness.

# Start-up



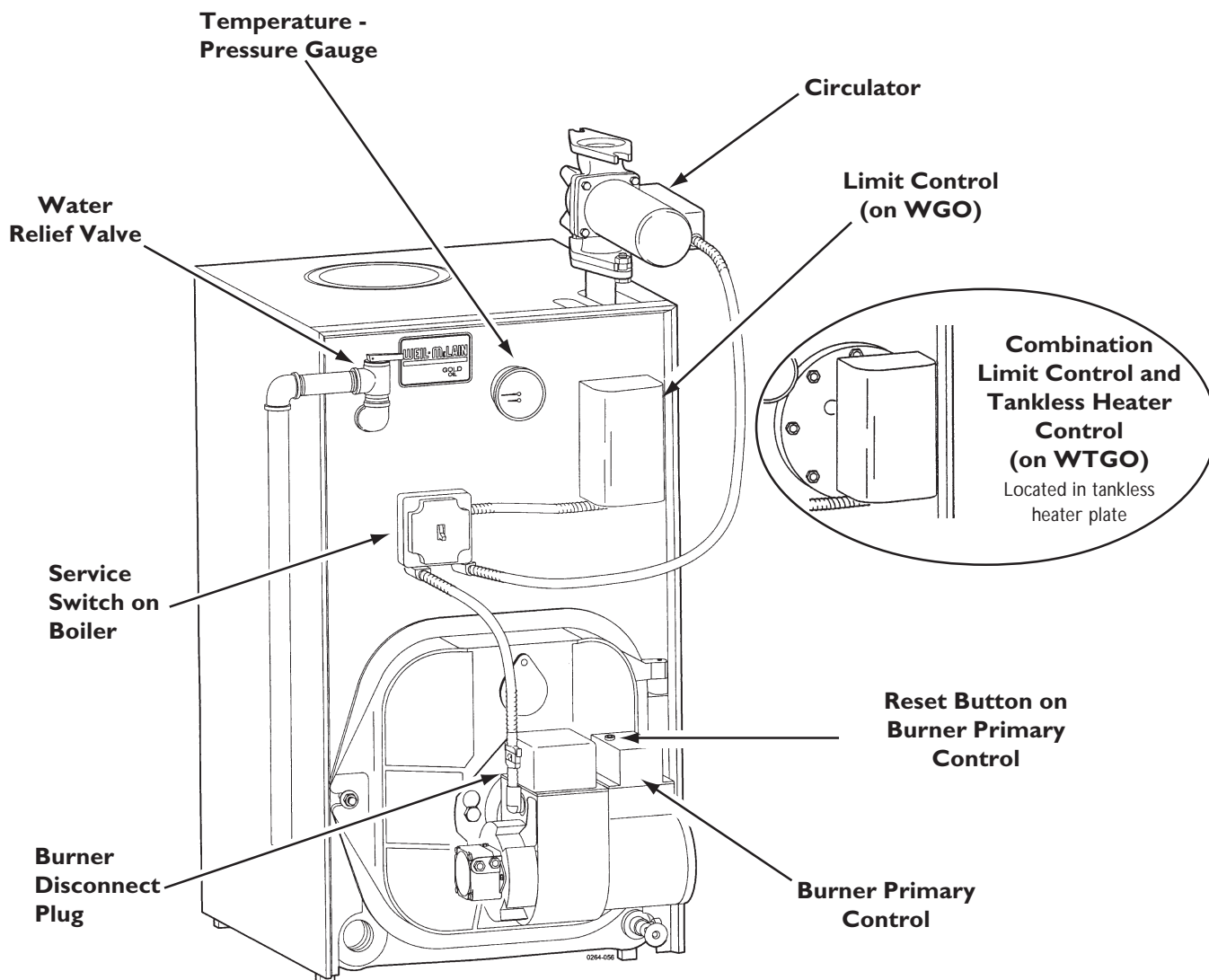
## WGO/WTGO (see Figure 1):

1. If **burner does not fire**, check for:
  - Service switch on boiler or additional switches turned off.
  - Fuses or breaker switch tripped.
  - Thermostat set below room temperature.
  - Fuel valves turned off.
  - Not enough oil in tank to supply burner.

2. Correct problems found in step #1. If burner does not fire, press reset button on burner primary control only once. Repeated presses will deposit oil in combustion chamber.

**⚠ DANGER** Burner must never be fired when oil is in combustion chamber. Immediately call qualified service technician.

3. If burner still does not fire, call qualified service technician.



WGO and WTGO Boilers  
Figure 1



# Start-up

## SGO-W (see Figure 2):

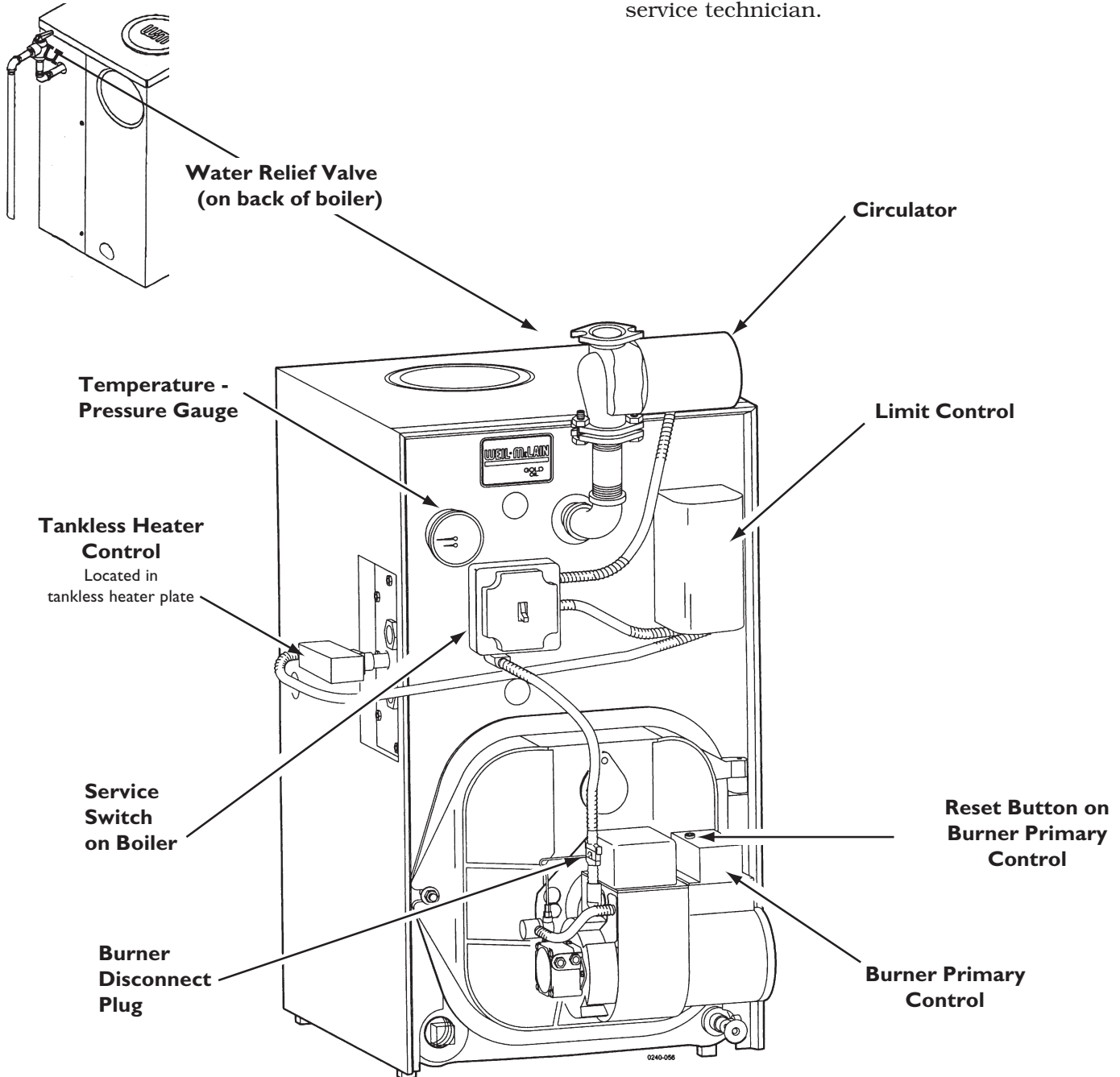
1. If **burner does not fire**, check for:
  - Service switch on boiler or additional switches turned off.
  - Fuses or breaker switch tripped.
  - Thermostat set below room temperature.
  - Fuel valves turned off.
  - Not enough oil in tank to supply burner.

2. Correct problems found in step #1. If burner does not fire, press reset button on burner primary control only once. Repeated presses will deposit oil in combustion chamber.



**DANGER** Burner must never be fired when oil is in combustion chamber. Immediately call qualified service technician.

3. If burner still does not fire, call qualified service technician.



<b>COMMON PROBLEMS</b>	<b>COMMON CAUSES</b>	<b>POSSIBLE CORRECTIONS</b>
Rapid cycling - burner turns on and off frequently.	Thermostat installed where drafts or heat affect reading.	Locate thermostat on inner wall away from heat sources or cool drafts.
	Heat anticipator in thermostat adjusted incorrectly.	Adjust heat anticipator to match current draw. Refer to boiler wiring diagram.
	Incorrect limit setting.	Have qualified service technician increase limit setting to decrease cycling. Maximum setting 220 deg. F.
Need to frequently add makeup water.	Leaks in boiler or piping.	Have qualified service technician repair leaks at once to avoid constant use of makeup water.
Popping or percolating noise heard in boiler.	Mineral deposits in sections due to constant use of makeup water, or incorrect pH.	Have qualified service technician de-lime boiler, repair leaks at once to avoid constant use of makeup water and check pH (between 7.0 and 8.5).
Black water condition.	Oxygen corrosion due to leaks in piping.	Have qualified service technician repair leaks at once to avoid constant use of makeup water and check pH (between 7.0 and 8.5).
Frequent release of water through relief valve.	Expansion tank sized too small or water-logged.	Have qualified service technician check expansion tank operation.
Metal flakes found in flueway.	Contaminated combustion air supply.	Remove sources of hydrocarbons in or near boiler area. (Bleaches, cleaners, chemicals, sprays, fabric softeners, paint remover, etc.)
	Condensation of combustion gases.	Have qualified service technician check boiler operation.
Some radiators or baseboard units do not heat or are noisy.	Air in system.	Bleed air from system through air vents in radiators or baseboard units.
	Low system pressure.	Have qualified service technician check for leaks in boiler or piping at once.
	High limit set too low.	Have qualified service technician adjust limit to higher setting.
Domestic water from tankless heater is hot then suddenly turns cold. OR Domestic water from tankless heater is always lukewarm.	Mineral deposits insulate internal waterways of heater.	Have qualified service technician delime or replace coil.
	Boiler stop-leak compound has been added to boiler water and is insulating outside of coil.	Have qualified service technician remove and clean coil AND drain and flush boiler to remove stop-leak.
	Incorrect mixing valve setting for tankless heater.	Have qualified service technician adjust mixing valve setting.
	Domestic flow rate too high.	Have qualified service technician install flow check valve set to rating of tankless heater.
	Incorrect setting on tankless heater control.	Have qualified service technician raise tankless control setting. Adjust differential on tankless control to lower setting.

**NOTICE**

The problems and corrections above represent common situations that can occur. There may be others not listed above. It is important always to contact a qualified service technician if you have any questions about the operation of your boiler or system.



# Annual Service Check List

**⚠ DANGER** The procedures and information on pages 7 through 11 are intended only for a qualified service technician who has the necessary equipment to inspect and adjust boiler and burner. A homeowner should never attempt these procedures. Qualified service technician must read pages 2 and 3 before proceeding.

Annual Service Call Check List (follow in order listed below)		D A T E	D A T E	D A T E	D A T E	D A T E	D A T E	D A T E	D A T E	D A T E	D A T E	Comments
1	Check that boiler area is free from combustible materials, gasoline and other flammable vapors and liquids.											
2	Check for and remove any obstruction to combustion and ventilation air flow to boiler.											
3	Check breeching and chimney or vent for obstructions, damage, etc. Repair or replace as necessary.											
4	Clean boiler flueways. See page 9.											
5	Perform service on relief valve and circulator. See page 11.											
6	Check boiler and piping for leaks and repair if found. Check for leaks at tankless heater plate. Tighten nuts only if leaks are found (for WTGO torque to 20-25 ft.lbs.).											
7	Inspect and adjust burner. See burner manual and: - change nozzle. - check ignition electrode settings. - clean blower housing and wheel. - make sure blower wheel turns freely. - oil burner motor if required. - clean air inlet. - clean or change fuel filter and strainer.											
8	Make sure boiler is filled with water.											
9	Start unit and verify combustion settings with combustion test equipment. See page 10.											
10	Verify operation of all controls on boiler. See page 11.											





## Cleaning boiler flueways:

**⚠ DANGER** Make sure all electrical connections to boiler are turned off and wait until boiler is warm, not hot, before cleaning. Failure to do so will result in severe personal injury, death or substantial property damage.

1. **Top flue boilers** -remove breeching and jacket top panel.  
**Rear flue boilers** - remove jacket top panel.
2. Remove flue collector hood, saving hardware for reassembly.
3. Shut off oil valves. Arrange drip pans under the areas of oil piping that will be disconnected. Disconnect oil line at burner so that you can swing open the door completely.
4. Line combustion chamber floor with newspaper to catch any soot that will be loosened in the cleaning process.
5. Starting at the top of the boiler, use a wire flue brush to thoroughly clean between all pins at all angles. Be careful not to damage side walls of rear refractory.
6. Move to the bottom of the flueways and clean up between the sections to reach pins left uncleaned in step #5.

7. Once the flueways are cleaned, carefully remove the paper from the floor of the combustion chamber.
8. Verify sealing rope around flue area is intact. Visually check condition and position of insulation in combustion chamber floor, and the refractories at the rear of boiler and in the burner mounting door. Replace any parts as necessary.
9. Close burner mounting door and tighten nut securely. Place flue collector hood on top of boiler. Secure with hardware from step #2.

**⚠ WARNING** Maintain a gas-tight seal to avoid possible flue gas leakage and carbon monoxide emissions, which can lead to severe personal injury or death.

10. Check breeching for sooting and clean if necessary. Install jacket top panel and breeching.
11. Reconnect oil line and all electrical connections.



**Thoroughly clean flueways between all pins at all angles. Start on top of boiler, finish from the bottom.**

Cleaning Boiler Flueways  
Figure 3



# Detailed Service Procedures

## Fill the system:

1. Close manual and automatic air vents and drain cock.
2. Fill to correct system pressure. Correct pressure will vary with each installation. Normal cold water fill pressure for residential systems is 12 psig. Boiler water pH 7.0 to 8.5 is recommended.

**NOTICE** Failure to maintain recommended pH level can cause section failure and leaks.

3. Open automatic air vent one turn.
4. a. Starting on the lowest floor, open air vents one at a time until water squirts out. Close vent.  
b. Repeat with remaining vents.
5. Refill to correct pressure.

## To place in operation:

**DANGER** Follow information below to prevent severe personal injury, death or substantial property damage:

- Do not use crankcase drainings or any oil containing gasoline. See burner manual for proper fuel oil.
- Do not attempt to start burner when excess oil has accumulated in combustion chamber, when unit is full of vapor, or when combustion chamber is very hot.
- Do not start burner unless collector hood, flue cap, jacket cap, breeching and burner mounting door are secured in place.
- Never burn garbage or paper in the boiler. Never leave combustible material around boiler.

1. Verify boiler is filled with water.
2. Open burner door and verify rear target wall, floor and burner door insulations are in proper condition and position.
3. Verify burner mounting door is closed and bolted tightly and burner plug is connected.
4. Refer to burner manual for burner start-up, adjustment and check-out procedures. Factory burner adjustment and settings may **not** be suitable for specific job conditions.

**WARNING** Make final burner adjustments using combustion test equipment to assure proper operation. Do not fire boiler without water. Sections will overheat, damaging boiler and resulting in substantial property damage.

5. Check boiler and system piping for leaks.
6. Inspect breeching and venting for proper operation.

# Detailed Service Procedures



## Controls requiring annual service:

### WATER RELIEF VALVE:

Check operation of water relief valve. Follow instructions on label fastened to relief valve.

**⚠ DANGER** Scald potential. Do not check operation of relief valve unless discharge piping has been installed according to Boiler Manual. If piping is not in place, a qualified service technician must properly install piping.

### CIRCULATOR:

Follow oil-lubricating instructions on circulator. Over-oiling will damage circulator. Water-lubricated circulators do not need oiling.

---

---

## General description of control operation:

### AUTOMATIC AIR VENT:

Air is released when cap is unscrewed one turn. If air vent leaks, remove small cap on top of vent, push in stem of valve and then release to clean valve seat. Screw cap completely on, then unscrew one turn.

### WATER RELIEF VALVE:

Provides discharge if boiler pressure exceeds 30 psig.

### TEMPERATURE LIMIT CONTROL:

If high boiler water temperature occurs, control shuts down burner, but allows circulator to run as long as there is a call for heat. Limit should be set higher than temperature needed for the system. Maximum limit setting is 220°F.

### CIRCULATOR:

Circulator provides forced water circulation through boiler and piping system.

### PRESSURE-TEMPERATURE GAUGE:

Provides reading of boiler pressure and temperature. Maximum boiler pressure is 50 psig, maximum water temperature is 220°F. Temperature will vary according to system and daily heating demands. The range will be from room temperature up to limit control setting.

### TANKLESS WATER HEATER:

Weil-McLain tankless heater ratings are based on 200°F boiler water temperature. To get rated output, set tankless heater control to 200°F. Control can be adjusted to meet system hot water requirements.

### EXPANSION TANK:

As water heats up, it expands. Tank provides a place for increased water volume. May be open, closed, or diaphragm-type. If relief valve opens frequently, expansion tank may be water-logged. Drain tank and re-establish proper air cushion.

1. Open-type - Located above highest radiator or baseboard unit, usually in the attic or closet. Has a gauge glass and overflow pipe to drain.
2. Closed-type - Welded gas tight and located above boiler. Tank is partially filled with water, leaving an air cushion for expansion.
3. Diaphragm-type - Welded gas tight with a rubber diaphragm to separate air from water. Tank must be located near boiler before inlet to circulator.  
An air vent must be installed in air vent tapping on boiler when this type of tank is used. This eliminates air in system. Normal cold water fill pressure is 12 psig. Tank pressure may be checked with an air pressure gauge.

